

BMTRY 763

Case Study (Spring 2023)

Georgia colon cancer (2001-2010)

The following data sets are available in the zip file: : *Georgia_colon_cancer.zip*

County_colon_Count_Expected_list.txt, Georgia_colon_cancer_ADJNUM_List.txt. For GeoBUGS you will need Georgia_Colon-cancer_polys2014.map. If you choose to use INLA then you will need Georgia_ordered_inlagraph.txt.

County_colon_Count_Expected_list.txt includes the yearly counts, expected rates for colon cancer (incidence) for a period of 10 years (2001-2010) in the counties of Georgia. Georgia_colon_cancer_ADJNUM.txt has the adjacencies you need for running spatial models on OpenBUGS. Georgia_ordered_inlagraph.txt is provided in case you want to use INLA. Georgia_predictors.txt contains two county level predictors: % poverty 2005, median income 2009. These predictors may be thought to have some influence on colon cancer outcomes.

GeoBUGS or INLA can be used to produce maps of the results of this analysis. In this case study I expect you to analyze this data either using OpenBUGS or INLA. I also include the fillmap.R function in case you want to map using R. *tmap* or *splot* can also be used for mapping, and a GeoBUGS SPlus output file is also provided (Georgia_counties_SPlus_export.txt).

Primary task: I expect you to carry out an appropriate exploratory analysis, including mapping. This should be followed by statistical analysis, and a discussion of your analysis. I would expect the analysis to include covariates, expected rates and random effects if appropriate. I expect you to evaluate models via DIC or WAIC and to report, in detail, on the best model found.

Secondary task: assess if any county or counties display hot spot clustering based on the 'best' model you found. Report your findings using appropriate maps. Assume a p-value of 0.99 as threshold for 'significant' clustering.

The final report should be in the region of 4000 words long (about 10 pages of text) excluding figures. **I am happy for individuals to work in groups. If you do then you must state who you worked with. Marking will be based on individual reports, however.**